CLAIMS

We claim:

1. A process for growing amorphous or polycrystalline silicon, comprising:
growing a film, including mixing:
(A) SiH_4 or a silane derivative, with
(B) a compound comprising Si, N and C in any combination.

2. The process of claim 1, wherein the compound comprising Si, N and C is

$(R\text{-}NH)_{4-n}SiX_n$ (I)

wherein R is an alkyl group (which may be the same or different), n is 1, 2 or 3, and X is H or halogen.

3. The process of claim 1, wherein the compound comprising Si, N and C is bis-tertiary butyl amino silane (BTBAS).

4. The process of claim 1, wherein silane is mixed with BTBAS.

5. The process of claim 1, wherein a polysilicon film is grown.

6. The process of claim 1, with a growth time in a range of 15 to 600 seconds for a RTCVD or PECVD process, at a pressure in a range of sub-millitorr to atmosphere, at a temperature in a range of 300 C to 800 C.

7. The process of claim 5, including mixing:
silane, in a range of 1 to 99% with
BTBAS, in a range of 1 to 99%.

8. The process of claim 7, including mixing silane at 45 sccm with BTBAS at 200 sccm.

9. The process of claim 1, wherein the silane derivative is selected from the group consisting of disilane, trisilane, hexachloro disilane and dichloro silane.

10. A reagent mixture from which to grow a film, comprising (A) SiH_4 or a silane derivative mixed with (B) a compound comprising Si, N and C in any combination.

11. The reagent mixture of claim 10, wherein compound (B) has formula

$$(R\text{-}NH)_{4-n}SiX_n \qquad (I)$$

wherein R is an alkyl group, n is 1, 2 or 3, and X is H or halogen.

12. The reagent mixture of claim 10, wherein compound (B) is bis-tertiary butyl amino silane (BTBAS).

13. The reagent mixture of claim 10, wherein SiH_4 is mixed with BTBAS to grow a polycrystalline film.

14. The reagent mixture of claim 10, wherein SiH_4 is mixed with BTBAS to grow an amorphous film.

15. The reagent mixture of claim 10, wherein the silane derivative is selected from the group consisting of disilane, trisilane, hexachloro disilane and dichloro silane.

16. A film controllably doped with carbon and/or nitrogen, produced by a process in which a compound comprising Si, N and C in any combination was mixed with SiH_4 or a silane derivative.

17. The film of claim 16, wherein the compound comprising Si, N and C has formula

$$(R\text{-}NH)_{4-n}SiX_n \qquad (I)$$

wherein R is an alkyl group (which may be the same or different), n is 1, 2 or 3, and X is H or halogen.

18. The film of claim 16, wherein BTBAS was mixed with SiH_4 and the film is polysilicon.

19. The film of claim 16, wherein BTBAS was mixed with a silane derivative selected from the group consisting of disilane, trisilane, hexachloro disilane and dichloro silane.

20. The film of claim 16, comprising carbon-rich and nitrogen-rich silicon, the nitrogen and carbon being at the interface of gate dielectric and poly (or amorphous) silicon, the film having a sheet-like nitrogen and carbon profile.